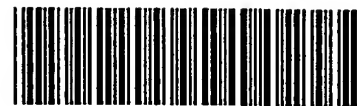# RAW SEQUENCE LISTING

The Biotechnology Systems Branch of the Scientific and Technical Information Center (STIC) no errors detected.

Application Serial Number: _10510,628_

Source: _PCT_

Date Processed by STIC: _10-16-04_

ENTERED

PCT

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        RAW SEQUENCE LISTING              DATE: 10/16/2004
        PATENT APPLICATION:  US/10/510,628    TIME: 08:47:58

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        Output Set: N:\CRF4\10162004\J510628.raw

     3 <110> APPLICANT: HEGEMANN, Peter
     5 <120> TITLE OF INVENTION: USE OF BIOLOGICAL PHOTORECEPTORS AS DIRECTLY LIGHT-
CONTROLLED
     6        ION CHANNELS
     8 <130> FILE REFERENCE: 231181
C--> 10 <140> CURRENT APPLICATION NUMBER: US/10/510,628
C--> 10 <141> CURRENT FILING DATE: 2004-10-08
    10 <160> NUMBER OF SEQ ID NOS: 4
    12 <170> SOFTWARE: PatentIn version 3.1
    14 <210> SEQ ID NO: 1
    15 <211> LENGTH: 712
    16 <212> TYPE: PRT
    17 <213> ORGANISM: Chlamydomonas reinhardtii
    19 <220> FEATURE:
    20 <223> OTHER INFORMATION: Amino acid sequence of CHOP-1 (AF461397) from
    21        Chlamydomonas reinhardtii
    23 <400> SEQUENCE: 1
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    28 Ala Ala Gly Ser Ala Gly Ala Ser Thr Gly Ser Asp Ala Thr Val Pro
    29              20                  25                  30
    31 Val Ala Thr Gln Asp Gly Pro Asp Tyr Val Phe His Arg Ala His Glu
    32          35                  40                  45
    34 Arg Met Leu Phe Gln Thr Ser Tyr Thr Leu Glu Asn Asn Gly Ser Val
    35      50                  55                  60
    37 Ile Cys Ile Pro Asn Asn Gly Gln Cys Phe Cys Leu Ala Trp Leu Lys
    38 65                  70                  75                  80
    40 Ser Asn Gly Thr Asn Ala Glu Lys Leu Ala Ala Asn Ile Leu Gln Trp
    41              85                  90                  95
    43 Ile Thr Phe Ala Leu Ser Ala Leu Cys Leu Met Phe Tyr Gly Tyr Gln
    44              100                 105                 110
    46 Thr Trp Lys Ser Thr Cys Gly Trp Glu Glu Ile Tyr Val Ala Thr Ile
    47          115                 120                 125
    49 Glu Met Ile Lys Phe Ile Ile Glu Tyr Phe His Glu Phe Asp Glu Pro
    50      130                 135                 140
    52 Ala Val Ile Tyr Ser Ser Asn Gly Asn Lys Thr Val Trp Leu Arg Tyr
    53 145                 150                 155                 160
    55 Ala Glu Trp Leu Leu Thr Cys Pro Val Ile Leu Ile His Leu Ser Asn
    56              165                 170                 175
    58 Leu Thr Gly Leu Ala Asn Asp Tyr Asn Lys Arg Thr Met Gly Leu Leu
    59              180                 185                 190
    61 Val Ser Asp Ile Gly Thr Ile Val Trp Gly Thr Thr Ala Ala Leu Ser
    62          195                 200                 205
    64 Lys Gly Tyr Val Arg Val Ile Phe Phe Leu Met Gly Leu Cys Tyr Gly
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65      210                 215                 220
67 Ile Tyr Thr Phe Phe Asn Ala Ala Lys Val Tyr Ile Glu Ala Tyr His
68 225                 230                 235                 240
70 Thr Val Pro Lys Gly Ile Cys Arg Asp Leu Val Arg Tyr Leu Ala Trp
71                 245                 250                 255
73 Leu Tyr Phe Cys Ser Trp Ala Met Phe Pro Val Leu Phe Leu Leu Gly
74                 260                 265                 270
76 Pro Glu Gly Phe Gly His Ile Asn Gln Phe Asn Ser Ala Ile Ala His
77             275                 280                 285
79 Ala Ile Leu Asp Leu Ala Ser Lys Asn Ala Trp Ser Met Met Gly His
80         290                 295                 300
82 Phe Leu Arg Val Lys Ile His Glu His Ile Leu Leu Tyr Gly Asp Ile
83 305                 310                 315                 320
85 Arg Lys Lys Gln Lys Val Asn Val Ala Gly Gln Glu Met Glu Val Glu
86                 325                 330                 335
88 Thr Met Val His Glu Glu Asp Asp Glu Thr Gln Lys Val Pro Thr Ala
89             340                 345                 350
91 Lys Tyr Ala Asn Arg Asp Ser Phe Ile Ile Met Arg Asp Arg Leu Lys
92         355                 360                 365
94 Glu Lys Gly Phe Glu Thr Arg Ala Ser Leu Asp Gly Asp Pro Asn Gly
95     370                 375                 380
97 Asp Ala Glu Ala Asn Ala Ala Ala Gly Gly Lys Pro Gly Met Glu Met
98 385                 390                 395                 400
100 Gly Lys Met Thr Gly Met Gly Met Gly Met Gly Ala Gly Met Gly Met
101                 405                 410                 415
103 Ala Thr Ile Asp Ser Gly Arg Val Ile Leu Ala Val Pro Asp Ile Ser
104             420                 425                 430
106 Met Val Asp Phe Phe Arg Glu Gln Phe Ala Arg Leu Pro Val Pro Tyr
107         435                 440                 445
109 Glu Leu Val Pro Ala Leu Gly Ala Glu Asn Thr Leu Gln Leu Val Gln
110     450                 455                 460
112 Gln Ala Gln Ser Leu Gly Gly Cys Asp Phe Val Leu Met His Pro Glu
113 465                 470                 475                 480
115 Phe Leu Arg Asp Arg Ser Pro Thr Gly Leu Leu Pro Arg Leu Lys Met
116             485                 490                 495
118 Gly Gly Gln Arg Ala Ala Ala Phe Gly Trp Ala Ala Ile Gly Pro Met
119             500                 505                 510
121 Arg Asp Leu Ile Glu Gly Ser Gly Val Asp Gly Trp Leu Glu Gly Pro
122         515                 520                 525
124 Ser Phe Gly Ala Gly Ile Asn Gln Gln Ala Leu Val Ala Leu Ile Asn
125     530                 535                 540
127 Arg Met Gln Gln Ala Lys Lys Met Gly Met Met Gly Gly Met Gly Met
128 545                 550                 555                 560
130 Gly Met Gly Gly Gly Met Gly Met Gly Met Gly Met Gly Met Gly Met
131                 565                 570                 575
133 Ala Pro Ser Met Asn Ala Gly Met Thr Gly Gly Met Gly Gly Ala Ser
134             580                 585                 590
136 Met Gly Gly Ala Val Met Gly Met Gly Met Gly Met Gln Pro Met Gln
137             595                 600                 605
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139 Gln Ala Met Pro Ala Met Ser Pro Met Met Thr Gln Gln Pro Ser Met
140     610                 615                 620
142 Met Ser Gln Pro Ser Ala Met Ser Ala Gly Gly Ala Met Gln Ala Met
143 625             630                 635                 640
145 Gly Gly Val Met Pro Ser Pro Ala Pro Gly Gly Arg Val Gly Thr Asn
146             645                 650                 655
148 Pro Leu Phe Gly Ser Ala Pro Ser Pro Leu Ser Ser Gln Pro Gly Ile
149             660                 665                 670
151 Ser Pro Gly Met Ala Thr Pro Pro Ala Ala Thr Ala Ala Pro Ala Ala
152         675                 680                 685
154 Gly Gly Ser Glu Ala Glu Met Leu Gln Gln Leu Met Ser Glu Ile Asn
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157 Arg Leu Lys Asn Glu Leu Gly Glu
158 705                 710
160 <210> SEQ ID NO: 2
161 <211> LENGTH: 737
162 <212> TYPE: PRT
163 <213> ORGANISM: Chlamydomonas reinhardtii
165 <220> FEATURE:
166 <223> OTHER INFORMATION: Amino acid sequence of CHOP-2 (AF461397) from
167       Chlamydomonas reinhardtii
169 <400> SEQUENCE: 2
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175             20              25                  30
177 Gln Cys Tyr Cys Ala Gly Trp Ile Glu Ser Arg Gly Thr Asn Gly Ala
178         35                  40                  45
180 Gln Thr Ala Ser Asn Val Leu Gln Trp Leu Ala Ala Gly Phe Ser Ile
181     50                  55                  60
183 Leu Leu Leu Met Phe Tyr Ala Tyr Gln Thr Trp Lys Ser Thr Cys Gly
184 65                  70                  75                  80
186 Trp Glu Glu Ile Tyr Val Cys Ala Ile Glu Met Val Lys Val Ile Leu
187             85                  90                  95
189 Glu Phe Phe Phe Glu Phe Lys Asn Pro Ser Met Leu Tyr Leu Ala Thr
190             100                 105                 110
192 Gly His Arg Val Gln Trp Leu Arg Tyr Ala Glu Trp Leu Leu Thr Cys
193         115                 120                 125
195 Pro Val Ile Leu Ile His Leu Ser Asn Leu Thr Gly Leu Ser Asn Asp
196     130                 135                 140
198 Tyr Ser Arg Arg Thr Met Gly Leu Leu Val Ser Asp Ile Gly Thr Ile
199 145                 150                 155                 160
201 Val Trp Gly Ala Thr Ser Ala Met Ala Thr Gly Tyr Val Lys Val Ile
202             165                 170                 175
204 Phe Phe Cys Leu Gly Leu Cys Tyr Gly Ala Asn Thr Phe Phe His Ala
205             180                 185                 190
207 Ala Lys Ala Tyr Ile Glu Gly Tyr His Thr Val Pro Lys Gly Arg Cys
208         195                 200                 205
210 Arg Gln Val Val Thr Gly Met Ala Trp Leu Phe Phe Val Ser Trp Gly
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RAW SEQUENCE LISTING   DATE: 10/16/2004
PATENT APPLICATION: US/10/510,628   TIME: 08:47:58

Input Set : A:\231181.ST25.txt
Output Set: N:\CRF4\10162004\J510628.raw

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213 Met Phe Pro Ile Leu Phe Ile Leu Gly Pro Glu Gly Phe Gly Val Leu
214 225                  230                  235                  240
216 Ser Val Tyr Gly Ser Thr Val Gly His Thr Ile Ile Asp Leu Met Ser
217                  245                  250                  255
219 Lys Asn Cys Trp Gly Leu Leu Gly His Tyr Leu Arg Val Leu Ile His
220                  260                  265                  270
222 Glu His Ile Leu Ile His Gly Asp Ile Arg Lys Thr Thr Lys Leu Asn
223          275                  280                  285
225 Ile Gly Gly Thr Glu Ile Glu Val Glu Thr Leu Val Glu Asp Glu Ala
226          290                  295                  300
228 Glu Ala Gly Ala Val Asn Lys Gly Thr Gly Lys Tyr Ala Ser Arg Glu
229 305                  310                  315                  320
231 Ser Phe Leu Val Met Arg Asp Lys Met Lys Glu Lys Gly Ile Asp Val
232                  325                  330                  335
234 Arg Ala Ser Leu Asp Asn Ser Lys Glu Val Glu Gln Glu Gln Ala Ala
235          340                  345                  350
237 Arg Ala Ala Met Met Met Met Asn Gly Asn Gly Met Gly Met Gly Met
238          355                  360                  365
240 Gly Met Asn Gly Met Asn Gly Met Gly Gly Met Asn Gly Met Ala Gly
241          370                  375                  380
243 Gly Ala Lys Pro Gly Leu Glu Leu Thr Pro Gln Leu Gln Pro Gly Arg
244 385                  390                  395                  400
246 Val Ile Leu Ala Val Pro Asp Ile Ser Met Val Asp Phe Phe Arg Glu
247                  405                  410                  415
249 Gln Phe Ala Gln Leu Ser Val Thr Tyr Glu Leu Val Pro Ala Leu Gly
250          420                  425                  430
252 Ala Asp Asn Thr Leu Ala Leu Val Thr Gln Ala Gln Asn Leu Gly Gly
253          435                  440                  445
255 Val Asp Phe Val Leu Ile His Pro Glu Phe Leu Arg Asp Arg Ser Ser
256          450                  455                  460
258 Thr Ser Ile Leu Ser Arg Leu Arg Gly Ala Gly Gln Arg Val Ala Ala
259 465                  470                  475                  480
261 Phe Gly Trp Ala Gln Leu Gly Pro Met Arg Asp Leu Ile Glu Ser Ala
262          485                  490                  495
264 Asn Leu Asp Gly Trp Leu Glu Gly Pro Ser Phe Gly Gln Gly Ile Leu
265          500                  505                  510
267 Pro Ala His Ile Val Ala Leu Val Ala Lys Met Gln Gln Met Arg Lys
268          515                  520                  525
270 Met Gln Gln Met Gln Gln Ile Gly Met Met Thr Gly Gly Met Asn Gly
271 530                  535                  540
273 Met Gly Gly Gly Met Gly Gly Gly Met Asn Gly Met Gly Gly Gly Asn
274 545                  550                  555                  560
276 Gly Met Asn Asn Met Gly Asn Gly Met Gly Gly Gly Met Gly Asn Gly
277          565                  570                  575
279 Met Gly Gly Asn Gly Met Asn Gly Met Gly Gly Gly Asn Gly Met Asn
280          580                  585                  590
282 Asn Met Gly Gly Asn Gly Met Ala Gly Asn Gly Met Gly Gly Gly Met
283          595                  600                  605
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285 Gly Gly Asn Gly Met Gly Gly Ser Met Asn Gly Met Ser Ser Gly Val
286     610             615             620
288 Val Ala Asn Val Thr Pro Ser Ala Ala Gly Gly Met Gly Gly Met Met
289 625             630             635             640
291 Asn Gly Gly Met Ala Ala Pro Gln Ser Pro Gly Met Asn Gly Gly Arg
292             645             650             655
294 Leu Gly Thr Asn Pro Leu Phe Asn Ala Ala Pro Ser Pro Leu Ser Ser
295             660             665             670
297 Gln Leu Gly Ala Glu Ala Gly Met Gly Ser Met Gly Gly Met Gly Gly
298         675             680             685   .
300 Met Ser Gly Met Gly Gly Met Gly Gly Met Gly Gly Met Gly Gly Ala
301         690             695             700
303 Gly Ala Ala Thr Thr Gln Ala Ala Gly Gly Asn Ala Glu Ala Glu Met
304 705             710             715                     720
306 Leu Gln Asn Leu Met Asn Glu Ile Asn Arg Leu Lys Arg Glu Leu Gly
307             725             730             735
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311 <210> SEQ ID NO: 3
312 <211> LENGTH: 259
313 <212> TYPE: PRT
314 <213> ORGANISM: Halobacterium salinarum
316 <220> FEATURE:
317 <223> OTHER INFORMATION: Amino acid sequence of bacteriorhodopsin from
318       Halobacterium salinarum
320 <400> SEQUENCE: 3
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325             20              25              30
327 Gly Thr Leu Tyr Phe Leu Val Lys Gly Met Gly Val Ser Asp Pro Asp
328         35              40              45
330 Ala Lys Lys Phe Tyr Ala Ile Thr Thr Leu Val Pro Ala Ile Ala Phe
331     50              55              60
333 Thr Met Tyr Leu Ser Met Leu Leu Gly Tyr Gly Leu Thr Met Val Pro
334 65              70              75              80
336 Phe Gly Gly Glu Gln Asn Pro Ile Tyr Trp Ala Arg Tyr Ala Asp Trp
337             85              90              95
339 Leu Phe Thr Thr Pro Leu Leu Leu Leu Asp Leu Ala Leu Leu Val Asp
340         100             105             110
342 Ala Asp Gln Gly Thr Ile Leu Ala Leu Val Gly Ala Asp Gly Ile Met
343         115             120             125
345 Ile Gly Thr Gly Leu Val Gly Ala Leu Thr Lys Val Tyr Ser Tyr Arg
346     130             135             140
348 Phe Val Trp Trp Ala Ile Ser Thr Ala Ala Met Leu Tyr Ile Leu Tyr
349 145             150             155             160
351 Val Leu Phe Phe Gly Phe Thr Ser Lys Ala Glu Ser Met Arg Pro Glu
352             165             170             175
354 Val Ala Ser Thr Phe Lys Val Leu Arg Asn Val Thr Val Val Leu Trp
355             180             185             190
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VERIFICATION SUMMARY   DATE: 10/16/2004
PATENT APPLICATION: **US/10/510,628**   TIME: 08:47:59

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Output Set: **N:\CRF4\10162004\J510628.raw**

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L:10 M:271 C: Current Filing Date differs, Replaced Current Filing Date